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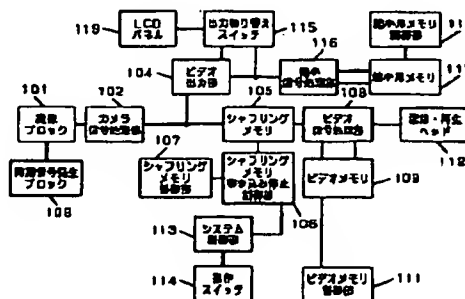
(54) ELECTRONIC IMAGE PICKUP DEVICE

(57) Abstract:

PROBLEM TO BE SOLVED: To provide an electronic image pickup device that displays a still image recorded even during recording of the still image and a still image or a moving image to be photographed next onto a screen simultaneously.

SOLUTION: An output of a video output section 104 is formed into a slave image whose time base is converted by a reduction memory 117, a reduction memory control section 118 and a shuffling memory control section 107 use a system control section 113 to write electronic video image information corresponding to optical information made incident at the same time to the reduction memory 117 and a shuffling memory 105, to stop the write and an output changeover switch 115 selects an output of a video output section 104 or an output of the reduction memory 117 to display a still image recorded even during recording the still image and a still image or a moving image photographed succeedingly simultaneously on the screen.

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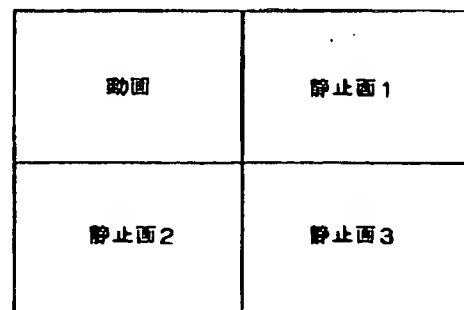
12

- * 104 ビデオ出力部
- 105 シャプリングメモリ
- 106 シャプリングメモリ書き込み停止制御部
- 107 シャプリングメモリ制御部
- 108 ビデオ信号処理部
- 109 ビデオメモリ
- 111 ビデオメモリ制御部
- 112 記録再生ヘッド
- 113 システム制御部
- 114 操作スイッチ
- 115 出力切り替えスイッチ
- 116 縮小信号処理部
- 117 縮小用メモリ
- 118 縮小用メモリ制御部
- 119 LCDパネル

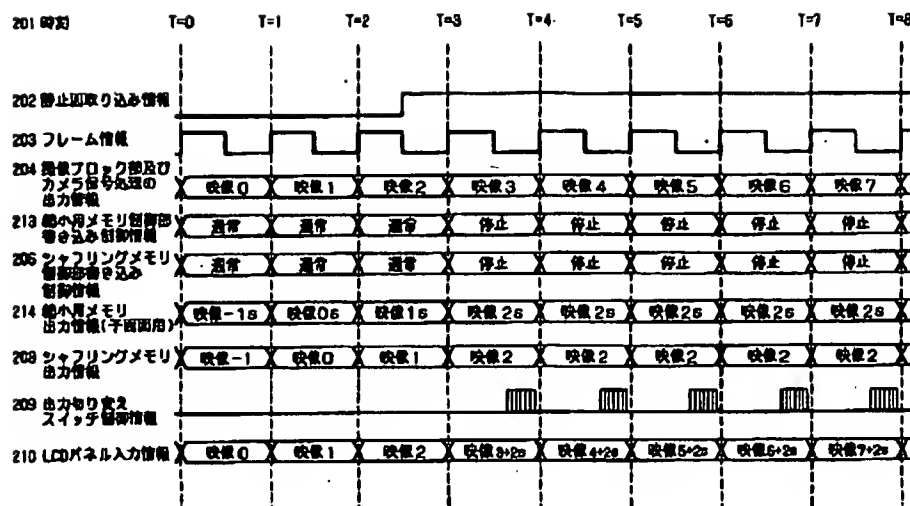
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graph TD
    101[101 撮影ブロック] --- 102[102 カメラ信号処理部]
    101 --- 103[103 同期信号発生ブロック]
    102 --- 104[104 ビデオ出力部]
    102 --- 105[105 シャフリングメモリ]
    103 --- 107[107 シャフリングメモリ制御部]
    104 --- 119[119 LCDパネル]
    104 --- 115[115 出力切り替えスイッチ]
    105 --- 115
    105 --- 106[106 ビデオメモリ制御部]
    115 --- 116[116 船小信号処理部]
    116 --- 117[117 船小メモリ]
    116 --- 118[118 船小メモリ制御部]
    105 --- 108[108 ビデオ信号処理部]
    108 --- 109[109 ビデオメモリ]
    108 --- 111[111 ビデオメモリ制御部]
    109 --- 112[112 記録・再生ヘッド]
    106 --- 110[110 システム制御部]
    110 --- 113[113 システム制御部]
    110 --- 114[114 操作スイッチ]
    111 --- 114
  
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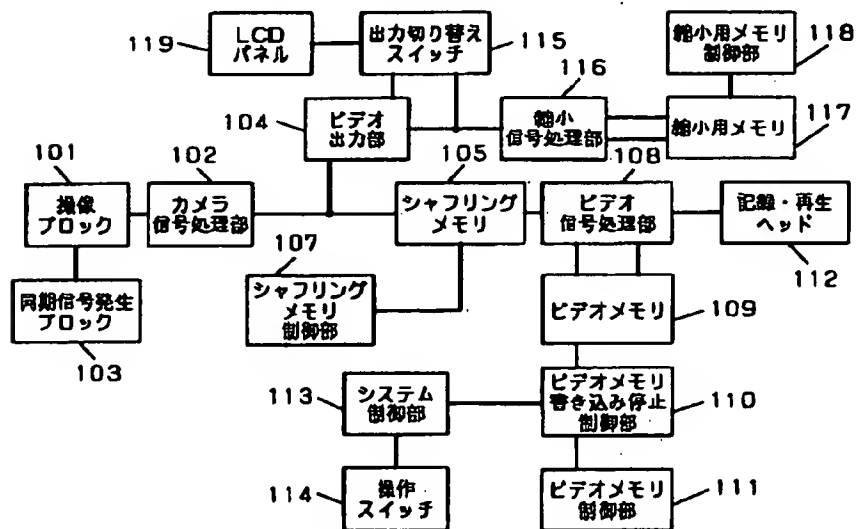
【图 6】.



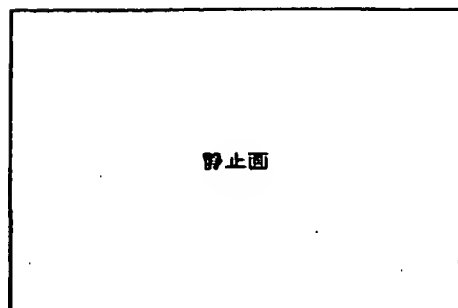
【図2】



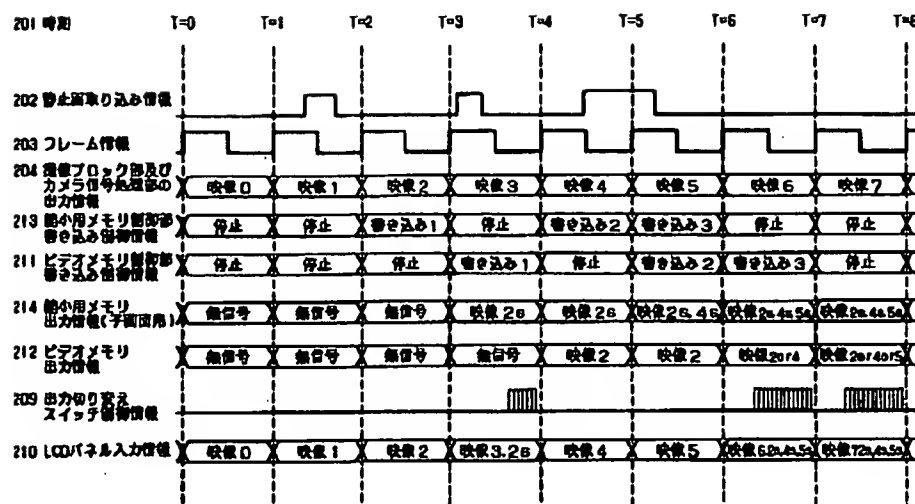
【図4】



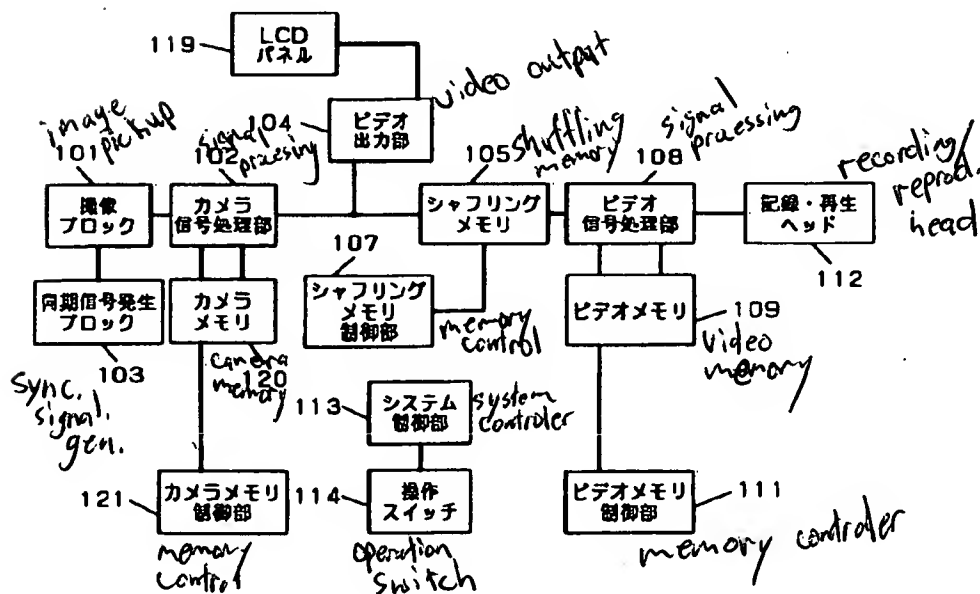
【図9】



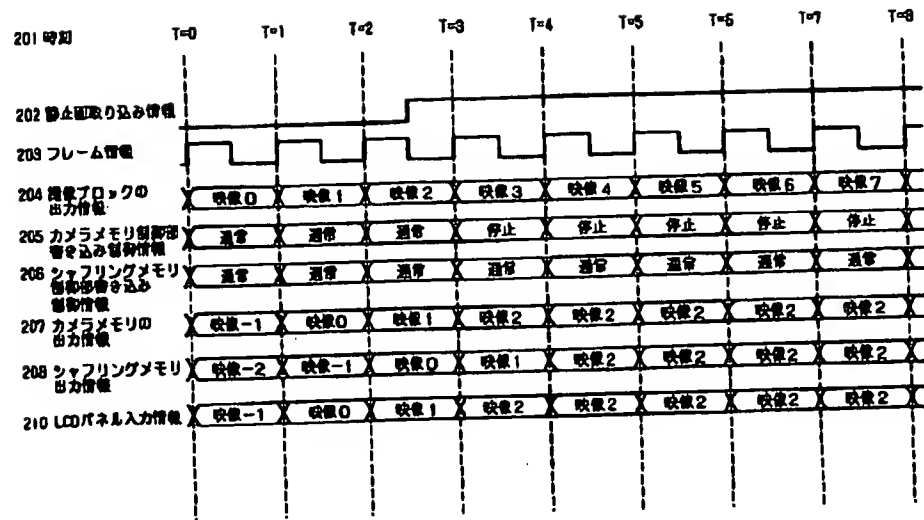
【例 5】



【图 7】



【図 8】



Japanese Patent Laid-Open No. 55619/1999

Laid-Open Date: February 26, 1999

Application No. 212806/1997

Application Date: August 7, 1997

Request for Examination: Not made

Inventor: Shoji Sou

Applicant: Matsushita Electric Industrial Co., Ltd.

Title of the Invention: ELECTRONIC IMAGE PICKUP APPARATUS

(54) [Title of the Invention] ELECTRONIC IMAGE PICKUP APPARATUS

(57) [Abstract]

【Problem】 There has been a problem that, during a still picture recording period, an image information to be outputted is fixed to the still picture.

【Means for Resolution】 A reducing memory 117 produces an output of a video output section 104 as a child picture subjected to a time axis conversion. A reducing memory control section 118 and a shuffling memory control section 107 write, by a system control section 113, an electronic image information corresponding to an optical information having entered at the same time to the reducing memory 117 and a shuffling memory 105, and thereafter stop the writing. An output switching

switch 115 can simultaneously display, even during a still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to an image plane by switching an output of the video output section 104 and an output of the reducing memory 117.

[Claims]

[Claim 1] An electronic image pickup apparatus having image pickup means for converting an optical information entering from an objective lens into an electronic image information, image signal processing means for signal-processing the electronic image information outputted at least by the image pickup means, 1st memory means, 1st memory control means for controlling a writing and a reading of the 1st memory means, a switch for switching an output of the image signal processing means and an output of the 1st memory means, switch control means for controlling the switch, 2nd memory means, 2nd memory control means for controlling a writing/reading of the 2nd memory means, and operation control means for controlling the electronic image pickup apparatus in accordance with an operation of a user, characterized in that the 1st memory means and the 1st memory control means produce the output of the image signal processing means as an information of a child image plane subjected to a time axis conversion, the 1st memory control means and the 2nd memory control means and the switch control means write, by a change in information from the operation control means, an electronic image information corresponding to the optical information, which has entered at the same time, to the 1st memory means and the 2nd memory means and thereafter stop the writing to the 1st memory means and the 2nd memory means, and the switch control means switches the output of the

image signal processing means and the output of the 1st memory means, thereby forming and outputting an image information in which the child image plane is inserted into a part of a parent image plane.

【Claim 2】 An electronic image pickup apparatus having image pickup means for converting an optical information entering from an objective lens into an electronic image information, image signal processing means for signal-processing the electronic image information outputted at least by the image pickup means, 1st memory means capable of writing and reading an information of a child image plane, of more than for one frame, subjected to a time axis conversion, 1st memory control means for controlling a writing and a reading of the 1st memory means, a switch for switching an output of the image signal processing means and an output of the 1st memory means, switch control means for controlling the switch, compression/expansion signal processing means for compressing/expanding the electronic image information, 3rd memory means capable of writing and reading a compressed information of more than for one compressed frame, which is an output of the compression/expansion signal processing means, 3rd memory control means for controlling a writing and a reading of the 3rd memory means, and operation control means for controlling the electronic image pickup apparatus in accordance with an operation of a user, characterized in that

the 1st memory means and the 1st memory control means produce the output of the image signal processing means as an information of a child image plane subjected to a time axis conversion, the 1st memory control means and the 3rd memory control means and the switch control means write, by a change in information from the operation control means, the information of the child image plane, of more than for optional one frame, corresponding to the optical information, which has entered at the same time, and the compressed information to the 1st memory means and the 3rd memory means and thereafter stop the writing to the 1st memory means and the 3rd memory means, and the switch control means switches the output of the image signal processing means and the output of the 1st memory means, thereby forming and outputting an image information in which the child image plane of more than for one frame is inserted into a part of a parent image plane.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Belongs] The present invention relates to an electronic image pickup apparatus such as a video tape recorder and an electronic camera.

[0002]

[Prior Art] In recent years, as to the electronic image pickup apparatus such the video tape recorder (hereafter, abbreviated as VTR) and the electronic camera, ones of various forms have

been developed, and an attention is riveted to a still picture photographing.

【0003】 Hereunder, it is explained about a conventional electronic image pickup apparatus. Fig. 7 is a block constitution diagram of an electronic image pickup apparatus which is one example of a conventional digital video camera (hereafter, abbreviated as DV camera). In Fig. 7, 101 is an image pickup block, and an incident light of a subject having passed through an objective lens is photoelectric-converted by an image pickup element and converted into an electronic image information by an analog signal processing. 102 is a camera signal processing section, and the electronic image information which is an output of the image pickup block 101 is digital-converted by an AD conversion and thereafter converted into a luminance and color difference information. 103 is a synchronization signal generation block. 104 is a video output section, and an output of the camera signal processing section 102 is converted into an image information.

【0004】 105 is a shuffling memory which is 2nd memory means, and it has a capacity capable of reading/writing a non-compressed information corresponding to more than for one frame. 107 is a shuffling memory control section which is 2nd memory control means. 108 is a video signal processing section, 109 a video memory which is 3rd memory means, 111 a video memory control section which is 3rd memory control means, 112 a

recording/reproducing head, 113 a system control section, and 114 an operation switch.

[0005] The shuffling memory 105 and the shuffling memory control section 107 write, at a recording time, an output of the camera signal processing section 102 on every one frame unit, thereafter output an information read (hereafter, abbreviated as shuffling) while being rearranged in a block unit in accordance with a certain rule and, at a reproducing time, write a shuffled output of the video signal processing section 108 on every one frame unit, and thereafter output an information read (hereafter, abbreviated as de-shuffling) while being rearranged to an arrangement of an image information in a block unit in accordance with a certain rule.

[0006] The video signal processing section 108, the video memory 109 and the video memory control section 111 compress, at the recording time, a shuffled output of the shuffling memory 105, thereafter output it to the recording/reproducing head 112 while being added with an additional information necessary for an error amendment and the recording and, at the reproducing time, error-amend and expand the compressed information reproduced by the recording/reproducing head 112, and output it to the shuffling memory 105. The video memory 109 has a capacity capable of reading/writing a compressed information corresponding to more than for one frame for the error amendment at the reproducing time and a special reproducing (the video

memory 109 uses a general purpose DRAM of 4 MBit, and corresponds to a capacity of more than for three frames of the compressed information).

[0007] 119 is a liquid crystal panel (hereafter, abbreviated as LCD panel) for display, 120 a camera memory, and 121 a camera memory control section for controlling the camera memory 120. By using the camera signal processing section 102, the camera memory 120 and the camera memory control section 121, a digital function such as a still picture and an electronic image plane enlargement (hereafter, abbreviated as digital zoom) is obtained.

[0008] Fig. 8 is a timing chart of an operation for recording a still picture in the conventional example. In Fig. 8, 201 is a time of a frame unit. 202 is a still picture taking information, and an output, of the image pickup block 101, corresponding to a frame at a time at which it changed from L to H is recorded as the still picture. 203 is a frame information which is an output of the synchronization signal generation block 103 and whose one cycle is a frame unit, 204 an output information of the image pickup block section 101, 205 a writing control information of the camera memory control section 121, 206 a writing control information of the shuffling memory control section 107, 207 an output information of the camera memory 120, 208 an output information of the shuffling memory 105, and 210 an LCD panel input information. Reading

control informations of the camera memory control section 121 and the shuffling memory control section 107 are, at the recording time, normally operated in each frame unit time.

【0009】 Fig. 9 is a schematic view representing an image information of the LCD panel 119 when a still picture of the conventional electronic image pickup apparatus is recorded.

【0010】 It is explained about an operation of the conventional electronic image pickup apparatus constituted in such a manner as mentioned above by referring to Fig. 7, Fig. 8 and Fig. 9.

【0011】 At a photographing time, the incident light of the subject passing through the objective lens is photoelectric-converted by the image pickup block 101, and converted into an electronic image information by an analog signal processing. The electronic image information which is an output information of the image pickup block 101 is AD-converted by the camera signal processing section 102, thereafter converted into the luminance and color difference information, subjected to a digital function processing such as the digital zoom and the still picture in the camera signal processing section 102 and the camera memory 120 and the camera memory control section 121 in accordance with a setting of the operation switch 114 by a photographer, and outputted to the video output section 104 and the shuffling memory 105. The information inputted to the shuffling memory 105 is written to the shuffling memory 105 for every one frame unit by the

shuffling memory control section 107, and thereafter a shuffled information is outputted. The shuffled information which is an output of the shuffling memory 105 is compressed in the video signal processing section 108 and the video memory 109 and the video memory control section 111, and thereafter recorded by the recording/reproducing head 112 while being added with the error amendment and the additional information necessary for the recording.

[0012] In case where the still picture is recorded, as shown in Fig. 8, the operation switch 114 is pushed over a time $T = 2 - 3$, and the still picture taking information 202 changes from L to H. The writing control signal 205 of the camera memory control section 121 after a time $T = 3$ which is a next frame is stopped, an image 2 written in the camera memory 120 is outputted, outputted from the video output section 104 to the LCD panel 119 and, at the same time, recorded through the shuffling memory 105, the video signal processing section 108 and the recording/reproducing head 112. Therefore, as shown in Fig. 9, in the LCD panel 119 the still picture taken is displayed over the whole image plane.

[0013]

[Problems that the Invention is to Solve] However, in the above conventional constitution, there has been a problem that, during a still picture recording period in case of recording the still picture, an image information to be outputted is fixed

by the still picture being recorded and, during that period, a dynamic picture image being picked up by the image pickup block 101 is not displayed completely.

[0014] The invention is one solving the above problem of the prior art, and its object is to provide an electronic image pickup apparatus capable of simultaneously displaying, even during a still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

[0015]

[Means for Solving the Problems] In order to achieve this object, the invention provides an electronic image pickup apparatus having 1st and 2nd memory means, 1st and 2nd memory control means for controlling a writing and a reading of each of the memory means, a switch for switching an output of image signal processing means and an output of the 1st memory means, switch control means for controlling the switch, and operation control means for controlling the apparatus in accordance with an operation of a user, characterized in that the 1st memory means and the 1st memory control means produce the output of the image signal processing means as an information of a child image plane subjected to a time axis conversion, the 1st memory means and the 2nd memory means and the switch control means write, by the operation control means, an electronic image information corresponding to an optical information, which has entered at

the same time, to the 1st and 2nd memory means and thereafter stop the writing to the 1st and 2nd memory means, and the switch control means switches the output of the image signal processing means and the output of the 1st memory means, thereby forming and outputting an image information in which the child image plane is inserted into a part of a parent image plane.

【0016】 By this constitution, there is obtained an electronic image pickup apparatus capable of simultaneously displaying, even during a still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

【0017】

【Mode for Carrying Out the Invention】 The invention recited in claim 1 is an electronic image pickup apparatus having image pickup means for converting an optical information entering from an objective lens into an electronic image information, image signal processing means for signal-processing the electronic image information outputted at least by the image pickup means, 1st memory means, 1st memory control means for controlling a writing and a reading of the 1st memory means, a switch for switching an output of the image signal processing means and an output of the 1st memory means, switch control means for controlling the switch, 2nd memory means, 2nd memory control means for controlling a writing/reading of the 2nd memory means, and operation control means for controlling the

electronic image pickup apparatus in accordance with an operation of a user, characterized in that the 1st memory means and the 1st memory control means produce the output of the image signal processing means as an information of a child image plane subjected to a time axis conversion, the 1st memory control means and the 2nd memory control means and the switch control means write, by a change in information from the operation control means, an electronic image information corresponding to the optical information, which has entered at the same time, to the 1st memory means and the 2nd memory means and thereafter stop the writing to the 1st memory means and the 2nd memory means, and the switch control means switches the output of the image signal processing means and the output of the 1st memory means, thereby forming and outputting an image information in which the child image plane is inserted into a part of a parent image plane, and it has such an action that it is possible to simultaneously display, even during a still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

[0018] The invention recited in claim 2 is an electronic image pickup apparatus having image pickup means for converting an optical information entering from an objective lens into an electronic image information, image signal processing means for signal-processing the electronic image information

outputted at least by the image pickup means, 1st memory means capable of writing and reading an information of a child image plane, of more than for one frame, subjected to a time axis conversion, 1st memory control means for controlling a writing and a reading of the 1st memory means, a switch for switching an output of the image signal processing means and an output of the 1st memory means, switch control means for controlling the switch, compression/expansion signal processing means for compressing/expanding the electronic image information, 3rd memory means capable of writing and reading a compressed information of more than for one compressed frame, which is an output of the compression/expansion signal processing means, 3rd memory control means for controlling a writing and a reading of the 3rd memory means, and operation control means for controlling the electronic image pickup apparatus in accordance with an operation of a user, characterized in that the 1st memory means and the 1st memory control means produce the output of the image signal processing means as an information of a child image plane subjected to a time axis conversion, the 1st memory control means and the 3rd memory control means and the switch control means write, by a change in information from the operation control means, the information of the child image plane, of more than for optional one frame, corresponding to the optical information, which has entered at the same time, and the compressed information to

the 1st memory means and the 3rd memory means and thereafter stop the writing to the 1st memory means and the 3rd memory means, and the switch control means switches the output of the image signal processing means and the output of the 1st memory means, thereby forming and outputting an image information in which the child image plane of more than for one frame is inserted into a part of a parent image plane, and it has such actions that after writing the still picture of more than for one frame to the 3rd memory a compressed information, corresponding to the optional frame, among the compressed informations written in the 3rd memory can be selected and recorded as a still picture and that, at the same time, it is possible to simultaneously and over more than for one frame display, even during a still picture recording, the still picture, of more than for one frame, being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

[0019] Hereunder, it is explained about embodiments of the invention by using Fig. 1 - Fig. 6.

(Embodiment 1) Fig.1 is a block diagram in an embodiment 1 of an electronic image pickup apparatus of the invention. In Fig.1, the same number is applied to a constituent element identical with that shown in Fig. 7, and its explanation is omitted.

[0020] In Fig. 1, 106 is a shuffling memory writing stop control

section for performing a writing control among the shuffling memory controls by switching stop/operation. 115 is an output switching switch, 116 a reduction signal processing section, 117 a reducing memory which is a 1st memory, and 118 a reducing memory control section for performing a control of writing/reading of the reducing memory 117. By the reduction signal processing section 116 and the reducing memory 117 and the reducing memory control section 118, an information of child image plane subjected to a time axis conversion is produced (for example, by thinning out either one of the writing or the reading at a rate of once per two times, an information having a size of 1/2 in both of horizontal and vertical directions is formed).

[0021] The output switching switch 115 and the shuffling memory writing stop control section 106 are controlled by the system control section 113.

[0022] Fig. 2 is a timing chart of an operation for recording a still picture in the electronic image pickup apparatus of the invention. In Fig. 2, the same number is applied to the signal, etc. identical with those shown in Fig. 8, and their explanations are omitted. In Fig. 2, 209 is an output switching switch control information for controlling a switching of the output switching switch 115, and an output of the video output section 104 is selected and outputted at L and an output of the reduction signal processing section 116 is selected and

outputted at H. 213 is a reducing memory control section writing control information which is an output of the reduction memory control section 118. 214 is a reducing memory output information which is an output information of the reducing memory 117, and "s" is recited to the information name in order to become an information of the child image plane subjected to the time axis conversion. Differences from Fig. 8 exist in a point that 204 became output informations of the image pickup block and the camera signal processing section, and a point that the output switching switch control information 209 and the reducing memory control section writing control information 213 were added.

[0023] Fig. 3 is a schematic view of the image plane of the LCD panel 119 representing an image information when recording the still picture of the electronic image pickup apparatus in the embodiment 1 of the invention.

[0024] As to the electronic image pickup apparatus constituted as mentioned above, its operation is explained by using Fig. 1, Fig. 2 and Fig. 3.

[0025] At a photographing time, the incident light of the subject passing through the objective lens is photoelectric-converted by the image pickup block 101, and converted into an electronic image information by an analog signal processing. The electronic image information which is an output information of the image pickup block 101 is AD-

converted by the camera signal processing section 102, thereafter converted into the luminance and color difference information, and outputted to the video output section 104 and the shuffling memory 105. The information inputted to the shuffling memory 105 outputs an information shuffled for every one frame unit by the shuffling memory control section 107. The shuffled information which is an output of the shuffling memory 105 is compressed in the video signal processing section 108 and the video memory 109 and the video memory control section 111, and thereafter recorded by the recording/reproducing head 112 while being added with the error amendment and the additional information necessary for the recording.

【0026】 The information inputted to the video output section 104 is outputted as a child image plane information subjected to the time axis conversion in the reduction signal control section 116 and the reducing memory 117 and the reducing memory control section 118.

【0027】 At a normal photographing time, an output of the camera signal processing section 102 is displayed in the LCD panel 119 through the video output section 104 and the output switching switch 115.

【0028】 In case where the still picture is recorded, the operation switch 114 is pushed over a time $T = 2 - 3$, and the still picture taking information 202 changes from L to H. The

writing control signal 213 of the reducing memory control section 118 after a time $T = 3$ which is a next frame and the writing control information 206 of the shuffling memory control section 107 are stopped and, at the same time, the output switching switch 115 is switched, and to the LCD panel 119 there is outputted an image information in which a child image plane is inserted into a part of a parent image plane in which an output of the video output section 104 is made the parent image plane and an output of the reduction signal processing section 116 is made an information (image 2s) of the child image plane (refer to Fig. 3). An information of image 2 written to the shuffling memory 105 over $T = 2 - 3$ is recorded through the shuffling memory 105, the video signal processing section 108 and the recording/reproducing head 112 after $T = 3$.

[0029] As mentioned above, according to a form of this embodiment, by forming and outputting the image information in which a child image plane is inserted into a part of a parent image plane during the still picture recording, there is obtained an action that it is possible to simultaneously display, even during the still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

[0030] (Embodiment 2) Fig. 4 is a block diagram in an embodiment 2 of the electronic image pickup apparatus of the invention. In Fig. 4, the same number is applied to a constituent element

identical with that shown in Fig. 1 and Fig. 7, and its explanation is omitted.

[0031] 110 is a video memory writing stop control section for performing a writing control among the video memory controls by switching stop/operation. A difference from the constitution of Fig. 1 exists in a point that a video memory writing stop control section 110 is added instead of the fact that the shuffling memory writing stop control section 106 is eliminated.

[0032] Fig. 5 is a timing chart of an operation for recording a still picture in the electronic image pickup apparatus of the embodiment 2 of the invention. Here, in Fig. 5, the same number is applied to the signal, etc. identical with those shown in Fig. 2 and Fig. 10, and their explanations are omitted. 211 is a writing control information of the video memory control section 111 for controlling the video memory 109. Differences from the timing chart of Fig. 2 exist in a point that a change in the still picture taking information exists in plural times, a point that the video memory control section writing control information 211 is added, and a point that an information outputted from the camera signal processing section 102 is taken as the still picture at a next frame time at which the still picture taking information 202 has changed.

[0033] "A numerical value after the writing" recited in a reducing memory control section writing control information

213 and the video memory control section writing control information 211 shows a writing place of the memory and a position information of the child image plane.

[0034] Fig. 6 is an image plane schematic view representing an image information of the LCD panel 119 when recording the still picture of the electronic image pickup apparatus in the embodiment 2 of the invention.

[0035] As to the electronic image pickup apparatus constituted as mentioned above, its operation is explained below. At a photographing time, the incident light of the subject passing through the objective lens is photoelectric-converted by the image pickup block 101, and converted into an electronic image information by an analog signal processing. The electronic image information which is an output information of the image pickup block 101 is AD-converted by the camera signal processing section 102, thereafter converted into the luminance and color difference information, and outputted to the video output section 104 and the shuffling memory 105. The shuffled information which is an output of the shuffling memory 105 is compressed in the video signal processing section 108 and the video memory 109 and the video memory control section 111, and thereafter recorded by the recording/reproducing head 112 while being added with the error amendment and the additional information necessary for the recording.

[0036] At a normal photographing time, an output of the camera

signal processing section 102 is displayed in the LCD panel 119 through the video output section 104 and the output switching switch 115.

【0037】 In case where the still picture is taken, an output from the camera signal processing section 102 is written to the shuffling memory 105 and the reducing memory 117, thereafter the reducing memory 117 is stopped from a time corresponding to a next frame and, at the same time, an output of the video output section 104 is made a parent image plane by switching the output switching switch control information 209, and to the LCD panel 119 there is outputted an image information in which a child image plane is inserted into a part of the parent image plane in which an output of the reduction signal processing section 116 is made the child image plane (refer to Fig. 8). The child image plane, which is written to the reducing memory 117 and corresponds to an information taken from the image pickup block 101 at the same time, and an information written to the shuffling memory 105 are outputted after one frame unit by the shuffling memory control section 107 as a shuffled information, are compressed by the video signal processing section 108, and are written to the video memory 109. The video memory 109 stops the writing during a period from a time corresponding to a next frame unit in which there has been written a compressed information taken at a time corresponding to the same time as the child image plane taken

to the reducing memory 117 to a time at which a next still picture taking is performed. This still picture taking operation is repeated in more than one time, and an information in which the child image planes of more than for one frame written to the reducing memory 117 are inserted into the parent image plane that is an output of the video output section 104 is displayed to the LCD panel 119 through the output switching switch 115 (Fig. 6). And, among informations of more than for one compressed frame, which are photographed at the same time as the child picture plane of more than for one frame written to the reducing memory 117 and are written to the video memory 109, a compressed information corresponding to an optional frame is recorded in accordance with an operation of the operation switch 114.

[0038] At a next frame time at which the still picture taking information 202 has changed from L to H, an output from the camera signal processing section 102 is taken as a still picture information. For example, it is explained about a case where the still picture taking information 202 changes at $T = 1 - 2$, $T = 3 - 4$ and $T = 4 - 5$.

[0039] In case where the operation switch 114 is pushed and the still picture taking information changes from L to H ($T = 1 - 2$, $T = 3 - 4$ and $T = 4 - 5$), an image 2, an image 4 and an image 5 of the output information 204 of the image pickup block and the camera signal processing section are written to

the reducing memory 117 and the shuffling memory 105 by a writing control information 213 of the reducing memory control section 118 and the writing control information of the shuffling memory writing control section over $T = 2 - 3$, $T = 4 - 5$ and $T = 5 - 6$ which are next frames. Over $T = 3 - 4$, $T = 5 - 6$ and $T = 6 - 7$ which are following next frames, the image 2, the image 4 and the image 5 written to the shuffling memory 105 in the previous frames are respectively read by being shuffled, compressed by the video signal processing section 108 and written to the video memory 109. An information of the child image plane corresponding to more than for one frame is written to the reducing memory 117, the output switching switch control information 209 which is an output of the system control section 113 is changed during a period ($T = 3 - 4$, $T = 7$ onward) in which the reducing memory control section writing information 213 is stopped, an output of the video output section 104 is made the parent image plane, and it is read from the reducing memory 117 and outputted from the reduction signal processing section 116 as the child picture plane. That is, the LCD panel input information 210 outputs the image information in which the child image plane is inserted into a part of the parent image plane to the video output section 104 (Fig. 6).

[0040] An information of the child image plane corresponding to more than for one frame is written to the reducing memory

117, the output switching switch control information 209 which is an output of the system control section 113 is changed during a period ($T = 4 - 6$) in which the writing control information 213 of the reducing memory control section 118 is performing the writing, and an output of the camera signal processing section 102 is outputted as it is to the video output section 104 and the shuffling memory 105. That is, the image information taken is outputted to the video output section 104 and the shuffling memory 105.

【0041】 A compressed information corresponding to an optional frame of the information of more than for one compressed frame written in the video memory 109 is recorded in accordance with an operation of the operation switch 114 through the video signal processing section 108 and the recording/reproducing head 112.

【0042】 As mentioned above, according to a form of this embodiment, in case where the still picture image information of more than for one frame is taken, by forming and outputting it as the image information in which the child image plane of more than for one frame is inserted into a part of the parent image plane, and by selecting and recording the compressed information corresponding to the optional frame of the still picture of more than for one frame taken, there are obtained such actions that it is possible to simultaneously display, even during the still picture recording, the still picture

being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane, and that it is possible to optionally select and record the information corresponding to the necessary frame from the taken still picture image of more than for one frame. At present, the video memory 109 uses a general purpose DRAM of 4 MBit, and since the data for three frames can be recorded in case of the compressed information, this embodiment can be realized by a small modification.

【0043】 Incidentally, in the above explanation, as to the electronic image pickup apparatus, a VTR block in which the recording medium is made a video tape has been explained as an example, but it may be an electronic still camera in which the storage is performed to a storage element such as semiconductor memory, and the invention can be applied also to a TV camera or the like which has no recording medium at all and transmits an image pickup electronic information to another image information processing apparatus by a radio transmission.

【0044】 Further, in the invention no mention is made about the camera memory, but there may be adopted a constitution in which it is added according to the present situation.

【0045】 Further, in case where the still picture recording is not performed, there may be adopted a constitution in which the reduction signal processing section 116, the reducing

memory 117 and the reducing memory control section 118 are stopped.

[0046] Further, there may be adopted a constitution in which the embodiment 1 and the embodiment 2 are combined. Further, there has been adopted the constitution in which the information in which the child image plane is inserted into the parent image plane is outputted to the LCD panel 119, but the display may be performed by means of outputting only the information by constituting an image output terminal instead of the LCD panel 119 and of connecting another image monitor equipment to this image output terminal.

[0047]

[Effects of the Invention] As mentioned above, by forming and outputting the image information in which the child image plane is inserted into a part of the parent image plane during the still picture recording, it is possible to simultaneously display, even during the still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane.

[0048] Further, in case where the still picture information of more than for one frame is taken, by forming and outputting the image information in which the child image plane of more than for one frame is inserted into the parent image plane, and by selecting and recording the information corresponding to the optional frame of the taken still picture of more than

for one frame, there are obtained such excellent effects that it is possible to simultaneously display, even during the still picture recording, the still picture being recorded and a still picture or a dynamic picture, which is photographed next, to the image plane, that it is possible to optionally select and record a necessary information from the taken still picture of more than for one frame and, and that it is possible to optionally change also a place of the writing memory and a position of the child image plane to be outputted.

[Brief Description of the Drawings]

[Fig. 1] A constitutional block diagram of an electronic image pickup apparatus in an embodiment 1 of the invention.

[Fig. 2] A timing chart for explaining an operation in the same.

[Fig. 3] An image plane schematic view of an LCD panel when recording a still picture in the same.

[Fig. 4] A constitutional block diagram of the electronic image pickup apparatus in an embodiment 2 of the invention.

[Fig. 5] A timing chart for explaining the operation in the same.

[Fig. 6] An image plane schematic view of the LCD panel when recording the still picture in the same.

[Fig. 7] A constitutional block diagram in a conventional electronic image pickup apparatus.

[Fig. 8] A timing chart for explaining an operation in the same.

[Fig. 9] An image plane schematic view of the LCD panel when

recording the still picture in the same.

[Description of the Reference Numerals]

- 101 image pickup block
- 102 camera signal processing section
- 103 synchronization signal generation block
- 104 video output section
- 105 shuffling memory
- 106 shuffling memory writing stop control section
- 107 shuffling memory control section
- 108 video signal processing section
- 109 video memory
- 111 video memory control section
- 112 recording/reproducing head
- 113 system control section
- 114 operation switch
- 115 output switching switch
- 116 reduction signal processing section
- 117 reducing memory
- 118 reducing memory control section
- 119 LCD panel

FIG. 1

101 IMAGE PICKUP BLOCK
102 CAMERA SIGNAL PROCESSING SECTION
103 SYNCHRONIZATION SIGNAL GENERATION BLOCK
104 VIDEO OUTPUT SECTION
105 SHUFFLING MEMORY
106 SHUFFLING MEMORY WRITING STOP CONTROL SECTION
107 SHUFFLING MEMORY CONTROL SECTION
108 VIDEO SIGNAL PROCESSING SECTION
109 VIDEO MEMORY
111 VIDEO MEMORY CONTROL SECTION
112 RECORDING/REPRODUCING HEAD
113 SYSTEM CONTROL SECTION
114 OPERATION SWITCH
115 OUTPUT SWITCHING SWITCH
116 REDUCTION SIGNAL PROCESSING SECTION
117 REDUCING MEMORY
118 REDUCING MEMORY CONTROL SECTION
119 LCD PANEL

FIG. 2

201 TIME
202 STILL PICTURE TAKING INFORMATION
203 FRAME INFORMATION
204 OUTPUT INFORMATION OF IMAGE PICKUP BLOCK SECTION AND

CAMERA SIGNAL PROCESSING

- 213 REDUCING MEMORY CONTROL SECTION WRITING CONTROL
INFORMATION
- 206 SHUFFLING MEMORY CONTROL SECTION WRITING CONTROL
INFORMATION
- 214 REDUCING MEMORY OUTPUT INFORMATION (FOR CHILD IMAGE
PLANE)
- 208 SHUFFLING MEMORY OUTPUT INFORMATION
- 209 OUTPUT SWITCHING SWITCH CONTROL INFORMATION
- 210 LCD PANEL INPUT INFORMATION
- a IMAGE 0, b IMAGE 1, c IMAGE 2, d IMAGE 3, e IMAGE 4,
f IMAGE 5, g IMAGE 6, h IMAGE 7,
i NORMAL, j STOP,
k IMAGE-1s, l IMAGE 0s, m IMAGE 1s, n IMAGE 2s,
o IMAGE-1,
p IMAGE 3+2s, q IMAGE 4+2s, r IMAGE 5+2s, s IMAGE 6+2s,
t IMAGE 7+2s.

FIG. 3

- a DYNAMIC PICTURE
- b STILL PICTURE 1

FIG. 4

- 101 IMAGE PICKUP BLOCK
- 102 CAMERA SIGNAL PROCESSING SECTION

103 SYNCHRONIZATION SIGNAL GENERATION BLOCK
104 VIDEO OUTPUT SECTION
105 SHUFFLING MEMORY
107 SHUFFLING MEMORY CONTROL SECTION
108 VIDEO SIGNAL PROCESSING SECTION
109 VIDEO MEMORY
110 VIDEO MEMORY WRITING STOP CONTROL SECTION
111 VIDEO MEMORY CONTROL SECTION
112 RECORDING/REPRODUCING HEAD
113 SYSTEM CONTROL SECTION
114 OPERATION SWITCH
115 OUTPUT SWITCHING SWITCH
116 REDUCTION SIGNAL PROCESSING SECTION
117 REDUCING MEMORY
118 REDUCING MEMORY CONTROL SECTION
119 LCD PANEL

FIG. 5

201 TIME
202 STILL PICTURE TAKING INFORMATION
203 FRAME INFORMATION
204 OUTPUT INFORMATION OF IMAGE PICKUP BLOCK SECTION AND
CAMERA SIGNAL PROCESSING SECTION
213 REDUCING MEMORY CONTROL SECTION WRITING CONTROL
INFORMATION

211 VIDEO MEMORY CONTROL SECTION WRITING CONTROL INFORMATION
214 REDUCING MEMORY OUTPUT INFORMATION (FOR CHILD IMAGE
PLANE)
212 VIDEO MEMORY OUTPUT INFORMATION
209 OUTPUT SWITCHING SWITCH CONTROL INFORMATION
210 LCD PANEL INPUT INFORMATION
a IMAGE 0, b IMAGE 1, c IMAGE 2, d IMAGE 3, e IMAGE 4,
f IMAGE 5, g IMAGE 6, h IMAGE 7,
i STOP, j WRITING 1, k WRITING 2, l WRITING 3,
m NO SIGNAL, n IMAGE 2s, o IMAGE 2s, 4s, p IMAGE 2s, 4s,
5s,
q IMAGE 2 or 4, r IMAGE 2 or 4 or 5,
s IMAGE 3, 2s, t IMAGE 6, 2s, 4s, 5s, u IMAGE 7, 2s, 4s, 5s.

FIG. 6

a DYNAMIC PICTURE
b STILL PICTURE 1
c STILL PICTURE 2
d STILL PICTURE 3

FIG. 7

101 IMAGE PICKUP BLOCK
102 CAMERA SIGNAL PROCESSING SECTION
103 SYNCHRONIZATION SIGNAL GENERATION BLOCK
104 VIDEO OUTPUT SECTION

105 SHUFFLING MEMORY
107 SHUFFLING MEMORY CONTROL SECTION
108 VIDEO SIGNAL PROCESSING SECTION
109 VIDEO MEMORY
111 VIDEO MEMORY CONTROL SECTION
112 RECORDING/REPRODUCING HEAD
113 SYSTEM CONTROL SECTION
114 OPERATION SWITCH
119 LCD PANEL
120 CAMERA MEMORY
121 CAMERA MEMORY CONTROL SECTION

FIG. 8

201 TIME
202 STILL PICTURE TAKING INFORMATION
203 FRAME INFORMATION
204 OUTPUT INFORMATION OF IMAGE PICKUP BLOCK
205 CAMERA MEMORY CONTROL SECTION WRITING CONTROL INFORMATION
206 SHUFFLING MEMORY CONTROL SECTION WRITING CONTROL
INFORMATION
207 OUTPUT INFORMATION OF CAMERA MEMORY
208 SHUFFLING MEMORY OUTPUT INFORMATION
210 LCD PANEL INPUT INFORMATION
a IMAGE 0, b IMAGE 1, c IMAGE 2, d IMAGE 3, e IMAGE 4,
f IMAGE 5, g IMAGE 6, h IMAGE 7,

i NORMAL, j STOP,
k IMAGE-1, l IMAGE-2.

FIG.9

a STILL PICTURE